

TB-FMCH-3GSDI2 Hardware User Manual

Rev.0.02

Preliminary

Revision History

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Rev.0.01	2012/03	Preliminary	Yoshioka
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Preliminary

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Introduction

Thank you for purchasing the TB-FMCH-3GSDI2 board. Before using the product, be sure to carefully read this user manual and fully understand how to correctly use the product. First read through this manual, then always keep it handy.




SAFETY PRECAUTIONS

Observe the instructions




Observe the precautions listed below to prevent injuries to you or other personnel or damage to property.












- Before using the product, read these safety precautions carefully to assure correct use.
- These precautions contain serious safety instructions that must be observed.
- After reading through this manual, be sure to always keep it handy.

The following conventions are used to indicate the possibility of injury/damage and classify precautions if the product is handled incorrectly.

 Danger	Indicates the high possibility of serious injury or death if the product is handled incorrectly.
 Warning	Indicates the possibility of serious injury or death if the product is handled incorrectly.
 Caution	Indicates the possibility of injury or physical damage in connection with houses or household goods if the product is handled incorrectly.

The following graphical symbols are used to indicate and classify precautions in this manual.
(Examples)

	Turn off the power switch.
	Do not disassemble the product.
	Do not attempt this.

 Warning	
	<p>In the event of a failure, disconnect the power supply.</p> <p>If the product is used as is, a fire or electric shock may occur. Disconnect the power supply immediately and contact our sales personnel for repair.</p>
	<p>If an unpleasant smell or smoking occurs, disconnect the power supply.</p> <p>If the product is used as is, a fire or electric shock may occur. Disconnect the power supply immediately. After verifying that no smoking is observed, contact our sales personnel for repair.</p>
	<p>Do not disassemble, repair or modify the product.</p> <p>Otherwise, a fire or electric shock may occur due to a short circuit or heat generation. For inspection, modification or repair, contact our sales personnel.</p>
	<p>Do not touch a cooling fan.</p> <p>As a cooling fan rotates in high speed, do not put your hand close to it. Otherwise, it may cause injury to persons. Never touch a rotating cooling fan.</p>
	<p>Do not place the product on unstable locations.</p> <p>Otherwise, it may drop or fall, resulting in injury to persons or failure.</p>
	<p>If the product is dropped or damaged, do not use it as is.</p> <p>Otherwise, a fire or electric shock may occur.</p>
	<p>Do not touch the product with a metallic object.</p> <p>Otherwise, a fire or electric shock may occur.</p>
	<p>Do not place the product in dusty or humid locations or where water may splash.</p> <p>Otherwise, a fire or electric shock may occur.</p>
	<p>Do not get the product wet or touch it with a wet hand.</p> <p>Otherwise, the product may break down or it may cause a fire, smoking or electric shock.</p>
	<p>Do not touch a connector on the product (gold-plated portion).</p> <p>Otherwise, the surface of a connector may be contaminated with sweat or skin oil, resulting in contact failure of a connector or it may cause a malfunction, fire or electric shock due to static electricity.</p>

**Caution****Do not use or place the product in the following locations.**

- Humid and dusty locations
- Airless locations such as closet or bookshelf
- Locations which receive oily smoke or steam
- Locations exposed to direct sunlight
- Locations close to heating equipment
- Closed inside of a car where the temperature becomes high
- Sticky locations
- Locations close to water or chemicals

Otherwise, a fire, electric shock, accident or deformation may occur due to a short circuit or heat generation.

**Do not place heavy things on the product.**

Otherwise, the product may be damaged.

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Disclaimer

This product is a board intended for **SDI/HD-SDI/3GSDI** interface. Tokyo Electron Device Limited assumes no responsibility for any damages resulting from the use of this product for purposes other than those stated.

Even if the product is used properly, Tokyo Electron Device Limited assumes no responsibility for any damages caused by:

- (1) Earthquake, thunder, natural disaster or fire resulting from the use beyond our responsibility, acts by a third party or other accidents, the customer's willful or accidental misuse or use under other abnormal conditions.
- (2) Secondary impact arising from use of this product or its unusable state (business interruption or others)
- (3) Use of this product against the instructions given in this manual.
- (4) Malfunctions due to connection to other devices.

Tokyo Electron Device Limited assumes no responsibility or liability for:

- (1) Erasure or corruption of data arising from use of this product.
- (2) Any consequences or other abnormalities arising from use of this product, or
- (3) Damage of this product not due to our responsibility or failure due to modification

This product has been developed by assuming its use for research, testing or evaluation. It is not authorized for use in any system or application that requires high reliability.

Repair of this product is carried out by replacing it on a chargeable basis, not repairing the faulty devices. However, non-chargeable replacement is offered for initial failure if such notification is received within two weeks after delivery of the product.

The specification of this product is subject to change without prior notice.

The product is subject to discontinuation without prior notice.

1. Related Documents and Board Accessories

All documents relating to this board can be downloaded from our website Club-X.

Accessories

Board Spacer Set

Transmission Cable Set

- DIN - BNC: SAMTEC RF179-74BJ3-78SP4-0300 x 2
- DIN - DIN: SAMTEC RF179-78SP4-78SP4-0300 x 1

2. Overview

The TB-FMCH-3GSDI2 board consists of National Semiconductor's 3G/HD/SD SDI equalizer/driver "LMH0387" x 4, video clock generator "LMH1983" and multi-format video sync separator "LMH1981".

The board uses Samtec's DIN coaxial connector "DIN7A-J-P-GFRA-BH1" for SDI equalizer/driver input/output and multi-format video sync separator analog video input.

The board also uses Samtec's FMC connector as a Carrier board connector for connection with a Carrier board using High-Pin Count connectors.

The board also provides a two-tiered FMC expansion connector to increase the number of input/output SDI equalizers/drivers.

(As an alternative, other different Low-Pin Count compliant board can be installed).

3. Feature

3G/HD/SD SDI equalizer/driver IC: National Semiconductor's LMH0387

Video clock generator IC: National Semiconductor's LMH1983

Video sync separator IC: National Semiconductor's LMH1981

75Ω coaxial connector: Samtec's DIN7A-J-P-GFRA-BH1

FMC connector: Samtec's ASP-134488-01 / ASP-134488-01

K	J	H	G	F	E	D	C	B	A
1	VREF B M2C	GND	VREF A M2C	GND	PG M2C	GND	PG C2M	GND	RES1
2	GND	CLK3 M2C P	PRSN1 M2C L	CLK1 M2C P	GND	HA01 P CC	GND	DP0 C2M P	DP1 M2C P
3	GND	CLK3 M2C N	GND	CLK1 M2C N	GND	HA01 N CC	GND	DP0 C2M N	DP1 M2C N
4	CLK2 M2C P	GND	CLK0 M2C P	GND	HA00 P CC	GND	DBTCLK9 M2C P	GND	DP9 M2C P
5	CLK2 M2C N	GND	CLK0 M2C N	GND	HA00 N CC	GND	DBTCLK9 M2C N	GND	DP9 M2C N
6	GND	HA03 P	GND	LA00 P CC	GND	HA05 P	GND	DP0 M2C P	GND
7	HA02 P	HA03 N	LA02 P	LA00 N CC	HA04 P	HA05 N	GND	DP0 M2C N	GND
8	HA02 N	GND	LA02 N	GND	HA04 N	GND	LA01 P CC	GND	DP8 M2C P
9	GND	HA07 P	GND	LA03 P	GND	HA09 P	LA01 N CC	GND	DP8 M2C N
10	HA06 P	HA07 N	LA04 P	LA03 N	HA08 P	HA09 N	GND	LA06 P	GND
11	HA06 N	GND	LA04 N	GND	HA08 N	GND	LA05 P	LA06 N	GND
12	GND	HA11 P	GND	LA08 P	GND	HA13 P	LA05 N	GND	DP7 M2C P
13	HA10 P	HA11 N	LA07 P	LA08 N	HA12 P	HA13 N	GND	GND	DP7 M2C N
14	HA10 N	GND	LA07 N	GND	HA12 N	GND	LA09 P	LA10 P	GND
15	GND	HA14 P	GND	LA12 P	GND	HA16 P	LA09 N	LA10 N	GND
16	HA17 P CC	HA14 N	LA11 P	LA12 N	HA15 P	HA16 N	GND	GND	DP6 M2C P
17	HA17 N CC	GND	LA11 N	GND	HA15 N	GND	LA13 P	GND	DP6 M2C N
18	GND	HA18 P	GND	LA16 P	GND	HA20 P	LA13 N	LA14 P	GND
19	HA21 P	HA18 N	LA15 P	LA16 N	HA19 P	HA20 N	GND	LA14 N	GND
20	HA21 N	GND	LA15 N	GND	HA19 N	GND	LA17 P CC	GND	DP5 M2C P
21	GND	HA22 P	GND	LA20 P	GND	HB03 P	LA17 N CC	GND	DP5 M2C N
22	HA23 P	HA22 N	LA19 P	LA20 N	HB02 P	HB03 N	GND	LA18 P CC	GND
23	HA23 N	GND	LA19 N	GND	HB02 N	GND	LA23 P	LA18 N CC	GND
24	GND	HB01 P	GND	LA22 P	GND	HB05 P	LA23 N	GND	DP9 C2M P
25	HB00 P CC	HB01 N	LA21 P	LA22 N	HB04 P	HB05 N	GND	GND	DP9 C2M N
26	HB00 N CC	GND	LA21 N	GND	HB04 N	GND	LA26 P	LA27 P	GND
27	GND	HB07 P	GND	LA25 P	GND	HB09 P	LA26 N	LA27 N	GND
28	HB06 P CC	HB07 N	LA24 P	LA25 N	HB08 P	HB09 N	GND	GND	DP8 C2M P
29	HB06 N CC	GND	LA24 N	GND	HB08 N	GND	TCK	GND	DP8 C2M N
30	GND	HB11 P	GND	LA29 P	GND	HB13 P	TDI	SCL	GND
31	HB10 P	HB11 N	LA28 P	LA29 N	HB12 P	HB13 N	TDO	SDA	GND
32	HB10 N	GND	LA28 N	GND	HB12 N	GND	3P3VAUX	GND	DP7 C2M P
33	GND	HB15 P	GND	LA31 P	GND	HB19 P	TMS	GND	DP7 C2M N
34	HB14 P	HB15 N	LA30 P	LA31 N	HB16 P	HB19 N	TRST L	GA0	GND
35	HB14 N	GND	LA30 N	GND	HB16 N	GND	GA1	GND	DP4 C2M P
36	GND	HB18 P	GND	LA33 P	GND	HB21 P	3P3V	GND	DP4 C2M N
37	HB17 P CC	HB18 N	LA32 P	LA33 N	HB20 P	HB21 N	GND	3P3V	GND
38	HB17 N CC	GND	LA32 N	GND	HB20 N	GND	3P3V	GND	DP5 C2M P
39	GND	VIO B M2C	GND	VREF1	GND	VREF2	GND	3P3V	DP5 C2M N
40	VIO B M2C	GND	VREF2	GND	VREF3	GND	3P3V	RES0	GND

Figure 3-1 FMC Connector Pin Assignment

4.1. Block Diagram

Figure 4-1 shows a block diagram of TB-FMCH-3GSDI board.

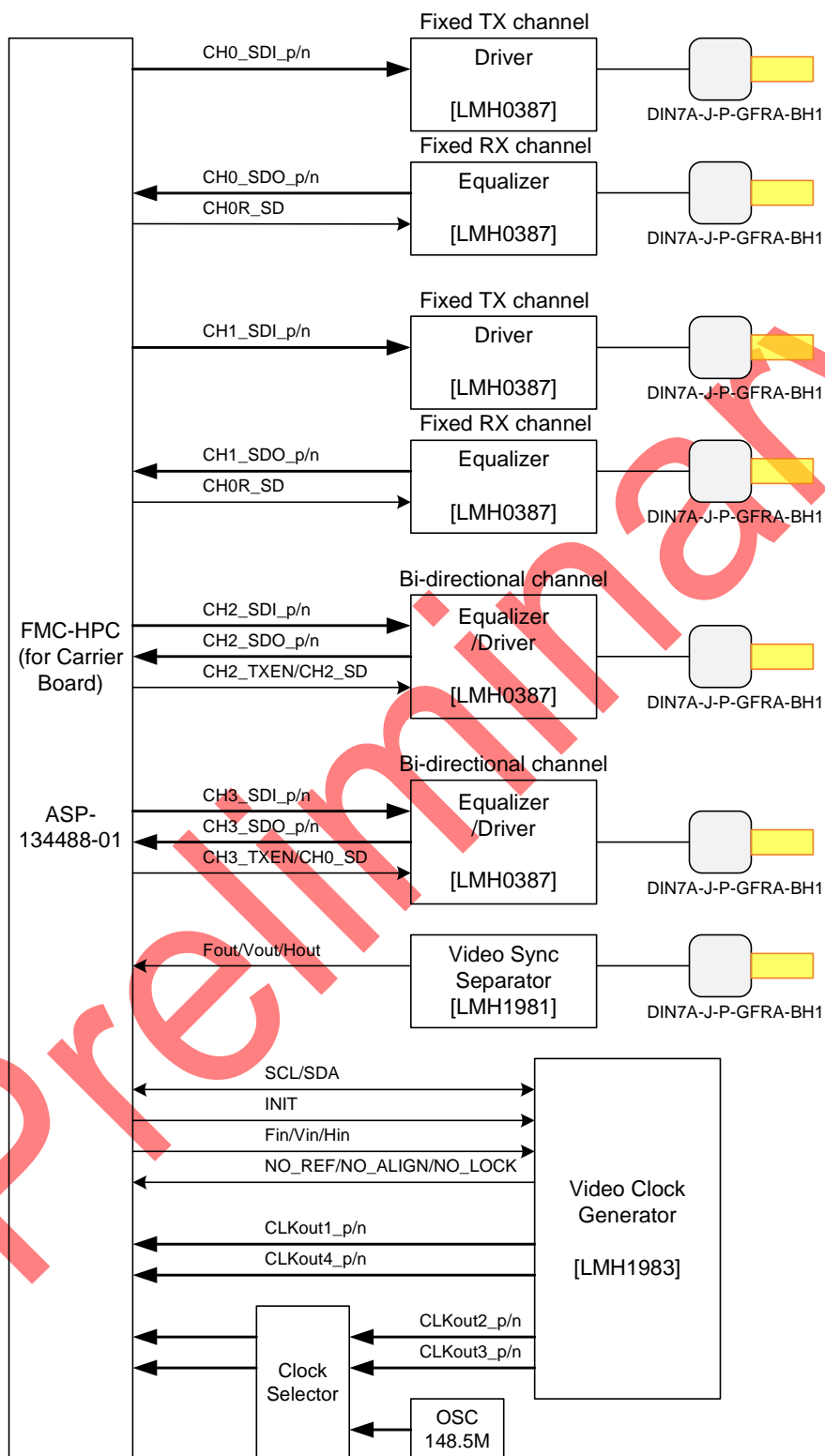


Figure 4-1 Block Diagram

Control Signals are buffered by level shifter TI SN74AVC16T24245DGG.

4.2. External View of the Board

Figures 4-2, 4-3 and 4-4 show the external views of the TB-FMCH-3GSDI board.

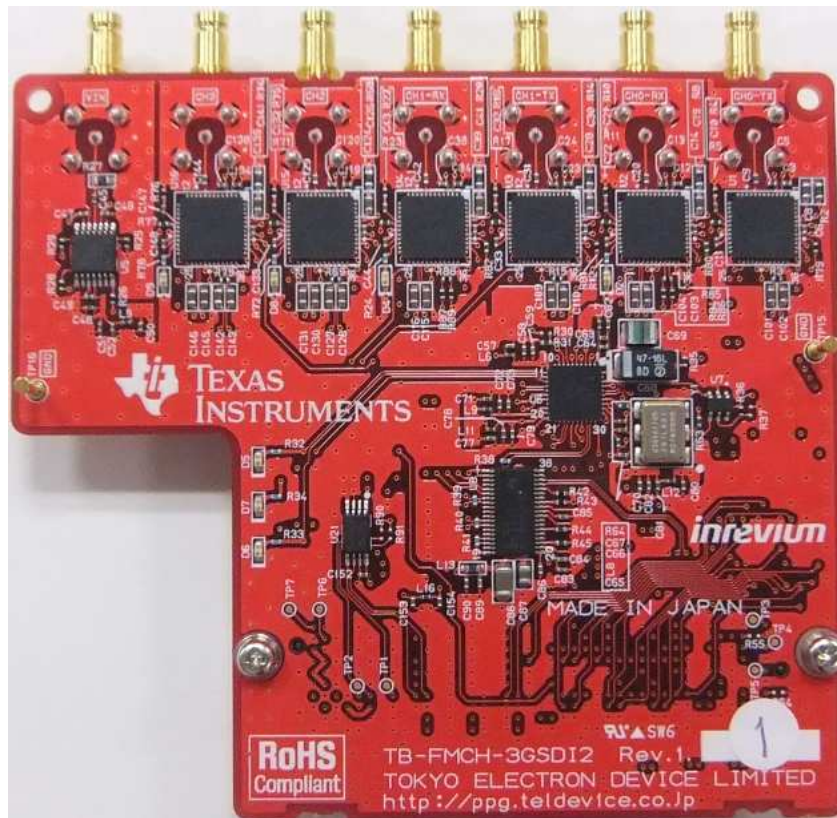


Figure 4-1 External View of the Board (component side)

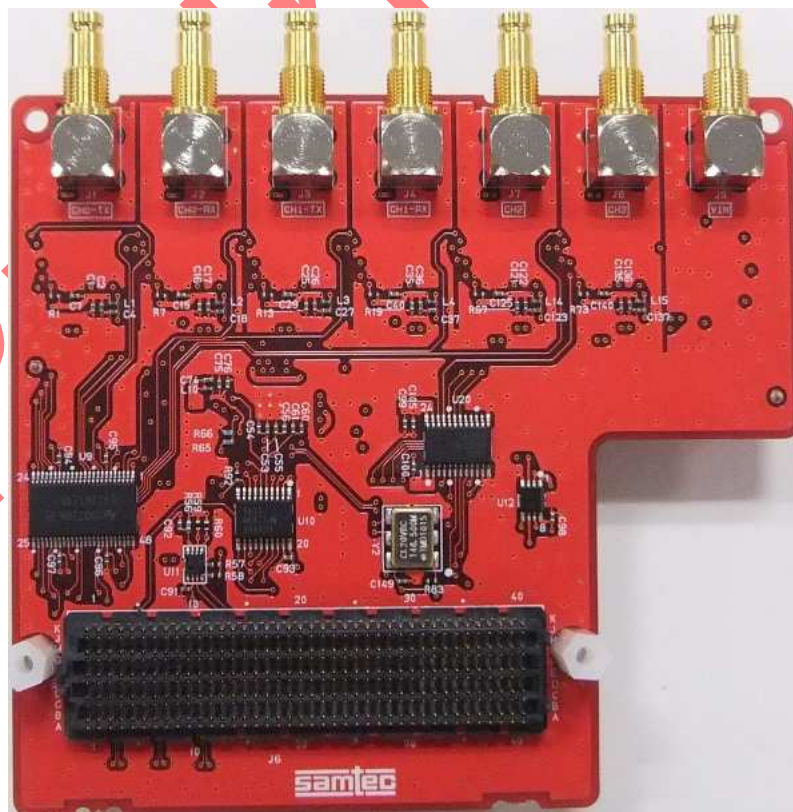


Figure 4-2 External View of the Board (solder side)

4.3. Board Specification

Figure 4-5 shows the TB-FMCH-3GSDI board specification.

External Dimensions: W: 84mm x H: 69mm

Number of Layers: 10

Board Thickness: 1.6mm

Material: FR-4

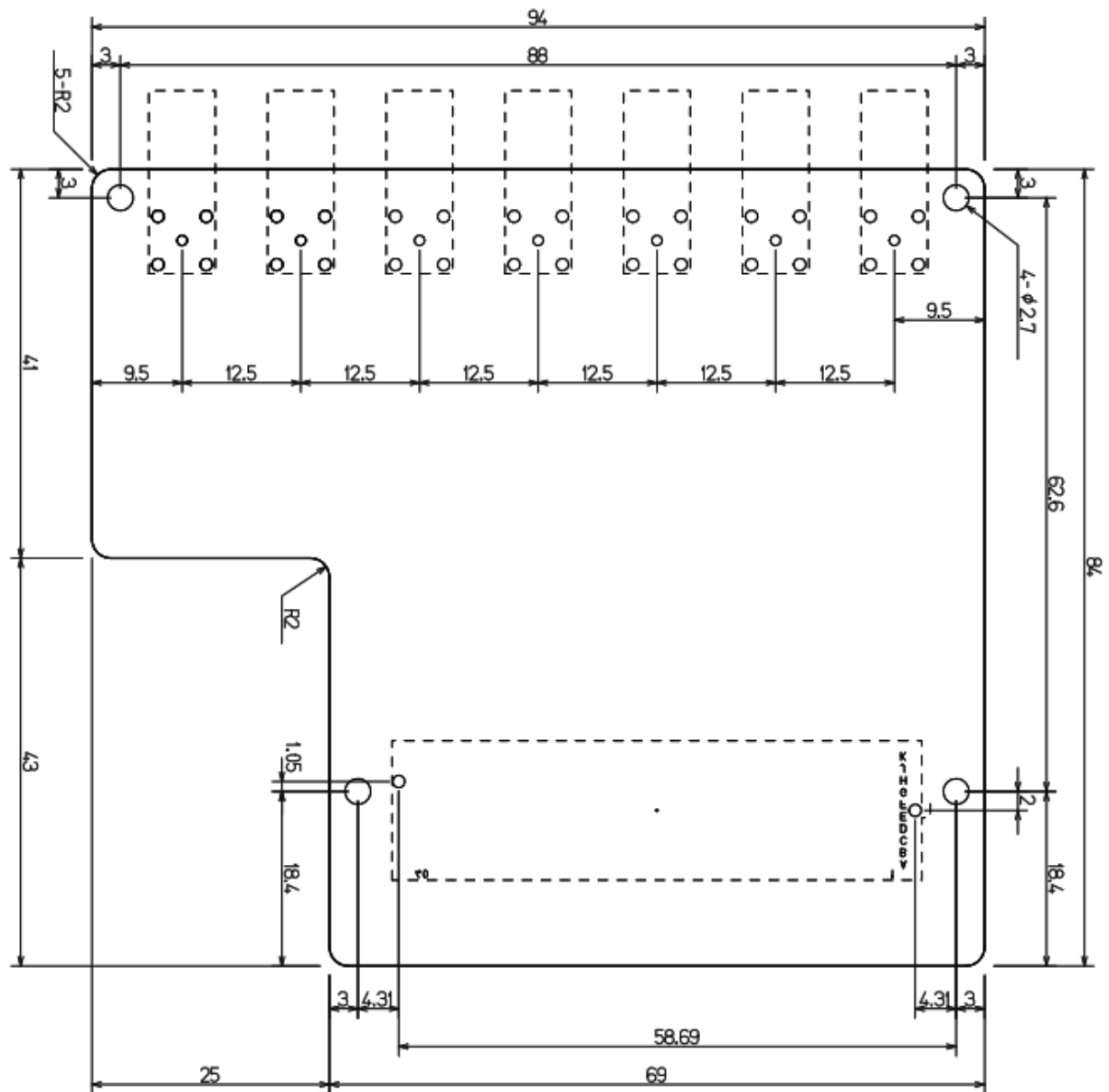


Figure 4-3 TB-FMCH-3GSDI Board Dimensions

4.4. Coaxial Connector

Samtec DIN7A-J-P-GFRA-BH1 DIN connectors are used for SDI equalizer/driver input/output and analog video sync input.

Table 4-1 shows the DIN connectors pin assignment.

Table 4-1 Coaxial Connector Pin Assignment

Connector #	Connected IC (Reference)	Purpose
J1	LMH0387 (U1)	3G/HD/SD SDI I/O channel-0 RX Only
J2	LMH0387 (U2)	3G/HD/SD SDI I/O channel-0 TX Only
J3	LMH0387 (U3)	3G/HD/SD SDI I/O channel-1 RX Only
J4	LMH0387 (U4)	3G/HD/SD SDI I/O channel-1 TX Only
J7	LMH0387 (U15)	3G/HD/SD SDI I/O channel-2 RX and TX
J8	LMH0387 (U16)	3G/HD/SD SDI I/O channel-3 RX and TX
J5	LMH1981 (U5)	Analog/video input

4.5. Analog Video Sync Input

Figure 4-7 shows the peripheral circuit of the analog/video input.

When video signals are input to the National Semiconductor's video sync separator "LMH1981", field synchronization, vertical synchronization and horizontal synchronization signals are generated and output to the Carrier board FMC connector.

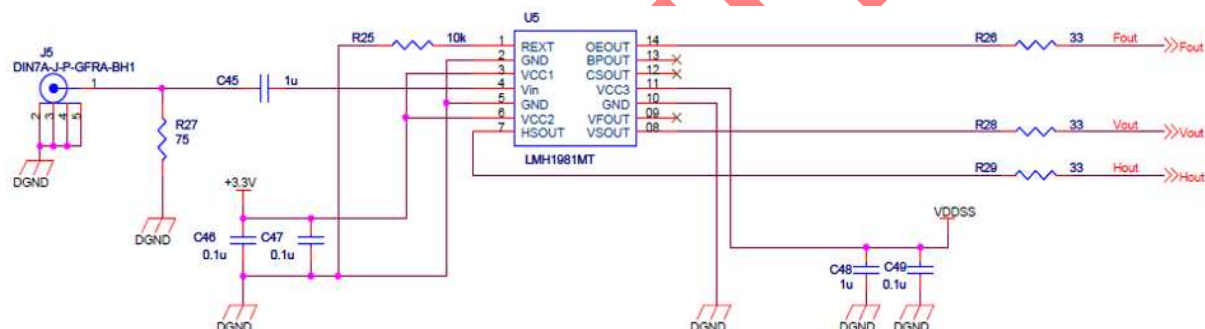


Figure 4-4 Peripheral Circuit of the Analog Video Sync Input

Figure 4-8 shows the peripheral circuit of the 3G/HD/SD SDI input/output(for example ch-3). National Semiconductor's SDI equalizer/driver "LMH0387" can be used as a driver by setting TX_EN pin to "H" or as an equalizer by setting the pin to "L". Furthermore, SD (SMPTE 259M) mode can be selected by setting SD/HD pin to "H" or 3G/HD (SMPTE 424M/292M) mode by setting the pin to "L".

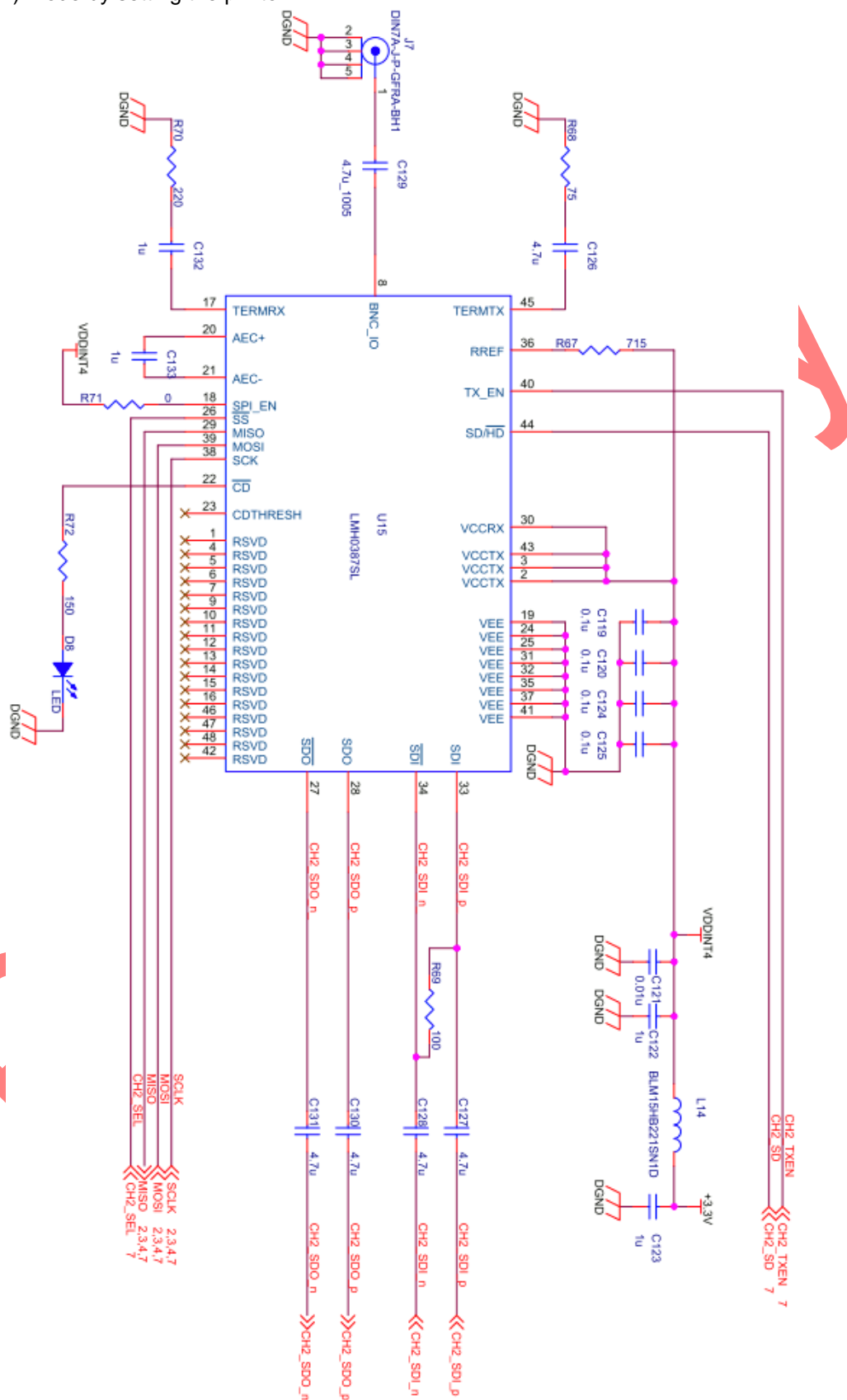


Figure 4-5 Peripheral Circuit of 3G/HD/SD SDI Input/Output

4.6. Video Clock Generator

Figure 4-9 shows the peripheral circuit of a video clock generator.

When field synchronization, vertical synchronization and horizontal synchronization signals from the Carrier board FMC connector are input to the National Semiconductor's video clock generator "LMH1983", synchronized video clocks (CLKout 1-4) and frame timing signals (Fout 1-4) are generated and output to the FMC expansion connector.

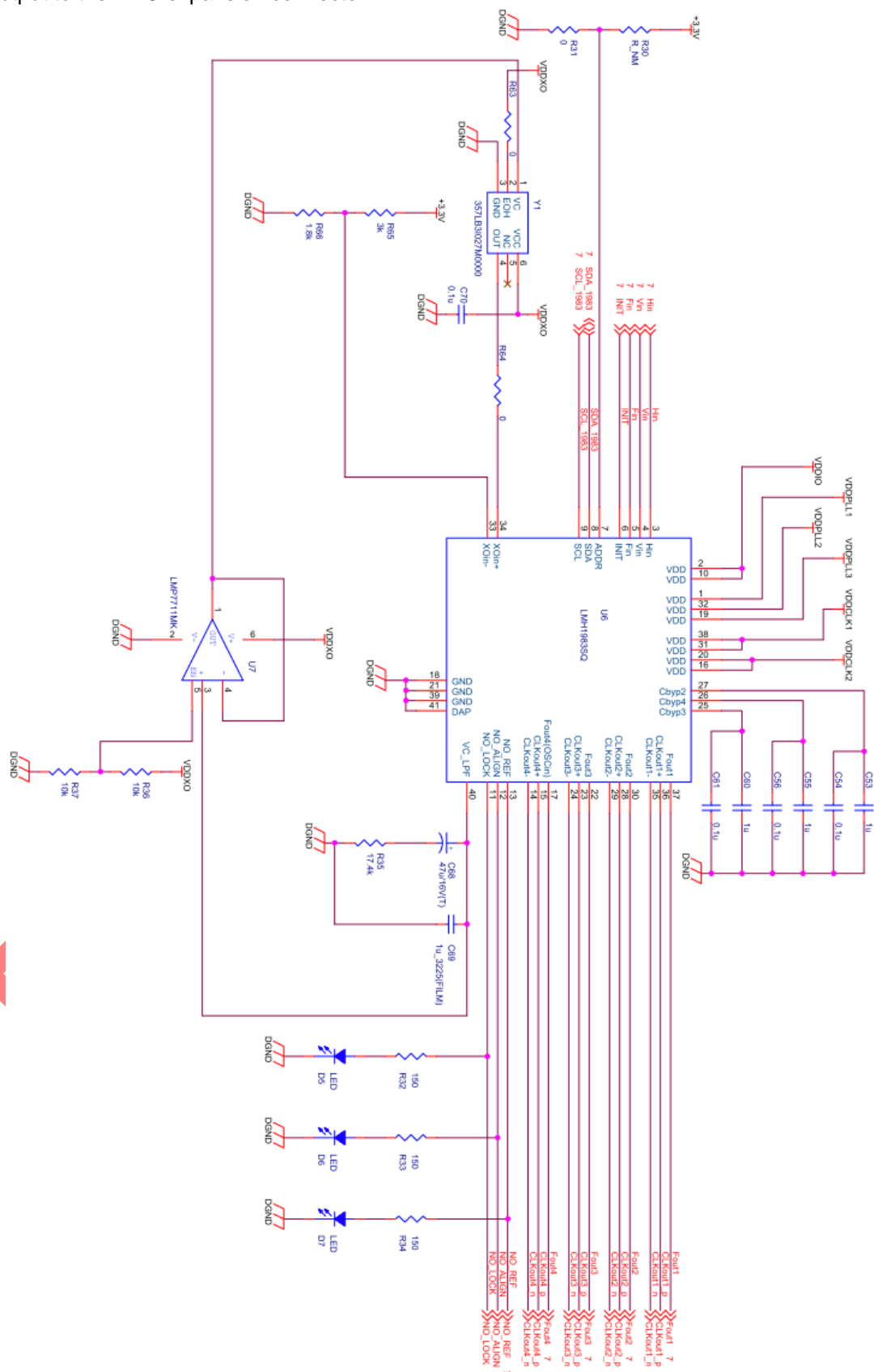


Figure 4-6 Peripheral Circuit of a Video Clock Generator

4.7. Clock Selector

This clock selector provide clock from Video Clock Generator(LMH1983) or OSC 148.5MHz. Clock select signals(S10,S11,S20,S21) connect to FMC connector.

The following figure shows the clock selector circuit.

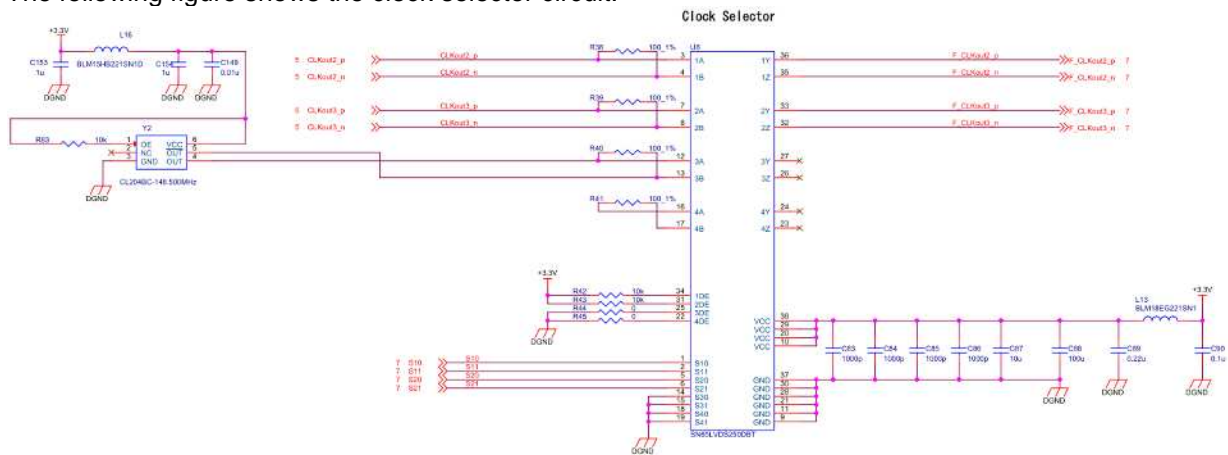


Figure 4-2 Clock Selector Circuit

Table 4-2 Carrier board FMC Connector Signal Settings

S10	S11	CLKout2 output to Carrier board FMC connector
OFF	OFF	Onboard CLKout2
OFF	ON	Onboard CLKout3
ON	OFF	OSC 148.5MHz
ON	ON	No signal

S20	S21	CLKout3 output to Carrier board FMC connector
OFF	OFF	Onboard CLKout2
OFF	ON	Onboard CLKout3
ON	OFF	OSC 148.5MHz
ON	ON	No signal

Table 4-3 Select signals pin assign of FMC

Signals	Pin
S10	H16 (LA11_P)
S11	H17 (LA11_N)
S20	H19 (LA15_P)
S21	H20 (LA15_N)

4.8. Carrier board FMC Connector

The board uses Samtec ASP-134488-01 Carrier board FMC connector (High-Pin Count) on the solder side of the board for mounting onto the Carrier board.

Table 4-4 Carrier board FMC Connector Pin Assignments

	A	I/O	Signal Name	Description
1	GND	-	-	-
2	DP1_M2C_P	O	CH1_SDO_p	SDI signal output from LMH0387 on CH1 (positive)
3	DP1_M2C_N	O	CH1_SDO_n	SDI signal output from LMH0387 on CH1 (negative)
4	GND	-	-	-
5	GND	-	-	-
6	DP2_M2C_P	O	CH2_SDO_p	SDI signal output from LMH0387 on CH2 (positive)
7	DP2_M2C_N	O	CH2_SDO_n	SDI signal output from LMH0387 on CH2 (negative)
8	GND	-	-	-
9	GND	-	-	-
10	DP3_M2C_P	O	CH3_SDO_p	SDI signal output from LMH0387 on CH3 (positive)
11	DP3_M2C_N	O	CH3_SDO_n	SDI signal output from LMH0387 on CH3 (negative)
12	GND	-	-	-
13	GND	-	-	-
14	DP4_M2C_P	N/C	-	-
15	DP4_M2C_N	N/C	-	-
16	GND	-	-	-
17	GND	-	-	-
18	DP5_M2C_P	N/C	-	-
19	DP5_M2C_N	N/C	-	-
20	GND	-	-	-
21	GND	-	-	-
22	DP1_C2M_P	I	CH1_SDI_p	SDI signal input to LMH0387 on CH1 (positive)
23	DP1_C2M_N	I	CH1_SDI_n	SDI signal input to LMH0387 on CH1 (negative)
24	GND	-	-	-
25	GND	-	-	-
26	DP2_C2M_P	I	CH2_SDI_p	SDI signal input to LMH0387 on CH2 (positive)
27	DP2_C2M_N	I	CH2_SDI_n	SDI signal input to LMH0387 on CH2 (negative)
28	GND	-	-	-
29	GND	-	-	-
30	DP3_C2M_P	I	CH3_SDI_p	SDI signal input to LMH0387 on CH3 (positive)
31	DP3_C2M_N	I	CH3_SDI_n	SDI signal input to LMH0387 on CH3 (negative)
32	GND	-	-	-
33	GND	-	-	-
34	DP4_C2M_P	N/C	-	-
35	DP4_C2M_N	N/C	-	-
36	GND	-	-	-
37	GND	-	-	-
38	DP5_C2M_P	N/C	-	-
39	DP5_C2M_N	N/C	-	-
40	GND	-	-	-

	B	I/O	Signal Name	Description
1	RES1	-	N/C	-
2	GND	-	-	-
3	GND	-	-	-
4	DP9_M2C_P	N/C	-	-
5	DP9_M2C_N	N/C	-	-
6	GND	-	-	-
7	GND	-	-	-
8	DP8_M2C_P	N/C	-	-
9	DP8_M2C_N	N/C	-	-
10	GND	-	-	-
11	GND	-	-	-
12	DP7_M2C_P	N/C	-	-
13	DP7_M2C_N	N/C	-	-
14	GND	-	-	-
15	GND	-	-	-
16	DP6_M2C_P	N/C	-	-
17	DP6_M2C_N	N/C	-	-
18	GND	-	-	-
19	GND	-	-	-
20	1 GBTCLK1_M2C_P	O	F_CLKout3_p	CLKout3 output from selected LMH1983 (positive)
21	1 GBTCLK1_M2C_N	O	F_CLKout3_n	CLKout3 output from selected LMH1983 (negative)
22	GND	-	-	-
23	GND	-	-	-
24	DP9_C2M_P	N/C	-	-
25	DP9_C2M_N	N/C	-	-
26	GND	-	-	-
27	GND	-	-	-
28	DP8_C2M_P	N/C	-	-
29	DP8_C2M_N	N/C	-	-
30	GND	-	-	-
31	GND	-	-	-
32	DP7_C2M_P	N/C	-	-
33	DP7_C2M_N	N/C	-	-
34	GND	-	-	-
35	GND	-	-	-
36	DP6_C2M_P	N/C	-	-
37	DP6_C2M_N	N/C	-	-
38	GND	-	-	-
39	GND	-	-	-
40	RES0	-	N/C	-

	C	I/O	Signal Name	Description
1	GND	-	-	-
2	DP0_C2M_P	I	CH0_SDI_p	SDI signal input to LMH0387 on EXP CH0 (positive)
3	DP0_C2M_N	I	CH0_SDI_n	SDI signal input to LMH0387 on EXP CH0 (negative)
4	GND	-	-	-
5	GND	-	-	-
6	DP0_M2C_P	O	CH0_SDO_p	SDI signal output from LMH0387 on CH0 (positive)
7	DP0_M2C_N	O	CH0_SDO_n	SDI signal output from LMH0387 on CH0 (positive)
8	GND	-	-	-
9	GND	-	-	-
10	LA06_P	I	F_CH0T_SD	SD/HD pin input to LMH0387 on CH0 TX
11	LA06_N	O	F_CH0R_SD	SD/HD pin input to LMH0387 on CH0 RX
12	GND	-	-	-
13	GND	-	-	-
14	LA10_P	I	F_CH1T_SD	SD/HD pin input to LMH0387 on CH1 TX
15	LA10_N	O	F_CH1R_SD	SD/HD pin input to LMH0387 on CH1 RX
16	GND	-	-	-
17	GND	-	-	-
18	LA14_P	I	F_CH2_SD	SD/HD pin input to LMH0387 on CH2
19	LA14_N	I	F_CH3_SD	SD/HD pin input to LMH0387 on CH3
20	GND	-	-	-
21	GND	-	-	-
22	LA18_P_CC	I	F_CH2_TXEN	TX_EN pin input to LMH0387 on CH2
23	LA18_N_CC	I	F_CH3_TXEN	TX_EN pin input to LMH0387 on CH3
24	GND	-	-	-
25	GND	-	-	-
26	LA27_P	N/C	-	-
27	LA27_N	N/C	-	-
28	GND	-	-	-
29	GND	-	-	-
30	2 SCL	I	-	SCL of EEPROM (U21)
31	2 SDA	I/O	-	SDA of EEPROM (U21)
32	GND	-	-	-
33	GND	-	-	-
34	3 GA0	-	Test Pad	M24C02-WDW6(U21) E0pin
35	6 12P0V	-	+12V	+12V power supply
36	GND	-	-	-
37	6 12P0V	-	+12V	+12V power supply
38	GND	-	-	-
39	6 3P3V	-	+3.3V	+3.3V power supply
40	GND	-	-	-

	D	I/O	Signal Name	Description
1	5 PG_C2M	-	N/C	R54 is not mounted
2	GND	-	-	-
3	GND	-	-	-
4	1	O	F_CLKout2_p	CLKout2 output from selected LMH1983
5	1	O	F_CLKout2_n	CLKout2 output from selected LMH1983
6	GND	-	-	-
7	GND	-	-	-
8	LA01_P_CC	I	F_CH0T_SEL	SS pin input to LMH0387 on CH0 TX
9	LA01_N_CC	I	F_CH0R_SEL	SS pin input to LMH0387 on CH0 RX
10	GND	-	-	-
11	LA05_P	I	F_CH1T_SEL	SS pin input to LMH0387 on CH1 TX
12	LA05_N	I	F_CH1R_SEL	SS pin input to LMH0387 on CH1 RX
13	GND	-	-	-
14	LA09_P	I	F_CH2_SEL	SS pin input to LMH0387 on CH2
15	LA09_N	I	F_CH3_SEL	SS pin input to LMH0387 on CH3
16	GND	-	-	-
17	LA13_P	I	F_MOSI	MOSI pin input to LMH0387 on all CHs
18	LA13_N	O	F_MISO	MISO pin output from LMH0387 on all CHs
19	GND	-	-	-
20	LA17_P_CC	I	F_SCLK	SCK pin input to LMH0387 on all CHs
21	LA17_N_CC	N/C	-	-
22	GND	-	-	-
23	LA23_P	N/C	-	-
24	LA23_N	N/C	-	-
25	GND	-	-	-
26	LA26_P	N/C	-	-
27	LA26_N	N/C	-	-
28	GND	-	-	-
29	TCK	-	N/C	-
30	4 TDI	-	N/C	-
31	4 TDO	-	N/C	-
32	6 3P3VAUX	-	+3.3V_AUX	+3.3V_AUX power supply
33	TMS	-	N/C	-
34	TRST_L	-	N/C	-
35	3 GA1	-	Test Pad	-
36	6 3P3V	-	+3.3V	+3.3V power supply
37	GND	-	-	-
38	6 3P3V	-	+3.3V	+3.3V power supply
39	GND	-	-	-
40	5 3P3V	-	+3.3V	+3.3V power supply

	E	I/O	Signal Name	Description
1	GND	I/O	Signal Name	Description
2	HA01_P_CC	-	-	-
3	HA01_N_CC	N/C	-	-
4	GND	N/C	-	-
5	GND	-	-	-
6	HA05_P	-	-	-
7	HA05_N	N/C	-	-
8	GND	N/C	-	-
9	HA09_P	-	-	-
10	HA09_N	N/C	-	-
11	GND	N/C	-	-
12	HA13_P	-	-	-
13	HA13_N	N/C	-	-
14	GND	N/C	-	-
15	HA16_P	-	-	-
16	HA16_N	N/C	-	-
17	GND	N/C	-	-
18	HA20_P	-	-	-
19	HA20_N	N/C	-	-
20	GND	N/C	-	-
21	HB03_P	-	-	-
22	HB03_N	N/C	-	-
23	GND	N/C	-	-
24	HB05_P	-	-	-
25	HB05_N	N/C	-	-
26	GND	N/C	-	-
27	HB09_P	-	-	-
28	HB09_N	N/C	-	-
29	GND	N/C	-	-
30	HB13_P	-	-	-
31	HB13_N	N/C	-	-
32	GND	N/C	-	-
33	HB19_P	-	-	-
34	HB19_N	N/C	-	-
35	GND	N/C	-	-
36	HB21_P	-	-	-
37	HB21_N	N/C	-	-
38	GND	N/C	-	-
39	6 VADJ	-	-	-
40	GND	-	FMC_VADJ	VADJ power supply

	F	I/O	Signal Name	Description
1	5 PG_M2C	-	Test Pad	TP5
2	GND	-	-	-
3	GND	-	-	-
4	HA00_P_CC	N/C	-	-
5	HA00_N_CC	N/C	-	-
6	GND	-	-	-
7	HA04_P	N/C	-	-
8	HA04_N	N/C	-	-
9	GND	-	-	-
10	HA08_P	N/C	-	-
11	HA08_N	N/C	-	-
12	GND	-	-	-
13	HA12_P	N/C	-	-
14	HA12_N	N/C	-	-
15	GND	-	-	-
16	HA15_P	N/C	-	-
17	HA15_N	N/C	-	-
18	GND	-	-	-
19	HA19_P	N/C	-	-
20	HA19_N	N/C	-	-
21	GND	-	-	-
22	HB02_P	N/C	-	-
23	HB02_N	N/C	-	-
24	GND	-	-	-
25	HB04_P	N/C	-	-
26	HB04_N	N/C	-	-
27	GND	-	-	-
28	HB08_P	N/C	-	-
29	HB08_N	N/C	-	-
30	GND	-	-	-
31	HB12_P	N/C	-	-
32	HB12_N	N/C	-	-
33	GND	-	-	-
34	HB16_P	N/C	-	-
35	HB16_N	N/C	-	-
36	GND	-	-	-
37	HB20_P	N/C	-	-
38	HB20_N	N/C	-	-
39	GND	-	-	-
40	6 VADJ	-	FMC_VADJ	VADJ power supply

	G	I/O	Signal Name	Description
1	GND	-	-	-
2	CLK1_M2C_P	O	CLKout4_p	CLKout4 output from LMH1983 (positive)
3	CLK1_M2C_N	O	CLKout4_n	CLKout4 output from LMH1983 (negative)
4	GND	-	-	-
5	GND	-	-	-
6	LA00_P_CC	O	F_Fout2	Fout2 output from LMH1983
7	LA00_N_CC	O	F_Fout3	Fout3 output from LMH1983
8	GND	-	-	-
9	LA03_P	O	F_Fout1	Fout1 output from LMH1983
10	LA03_N	O	F_Fout4	Fout4 output from LMH1983
11	GND	-	-	-
12	LA08_P	O	F_Vout	Vout output from LMH1981
13	LA08_N	O	F_Hout	Hout output from LMH1981
14	GND	-	-	-
15	LA12_P	O	F_Fout	Fout output from LMH1981
16	LA12_N	I	F_INIT	INIT pin input to LMH1983
17	GND	-	-	-
18	LA16_P	I	F_Vin	Vin pin input to LMH1983
19	LA16_N	I	F_Hin	Hin pin input to LMH1983
20	GND	-	-	-
21	LA20_P	I	F_Fin	Fin input to LMH1983
22	LA20_N	I/O	-	-
23	GND	-	-	-
24	LA22_P	I/O	-	-
25	LA22_N	I/O	-	-
26	GND	-	-	-
27	LA25_P	I/O	-	-
28	LA25_N	I/O	-	-
29	GND	-	-	-
30	LA29_P	I/O	-	-
31	LA29_N	I/O	-	-
32	GND	-	-	-
33	LA31_P	I/O	-	-
34	LA31_N	I/O	-	-
35	GND	-	-	-
36	LA33_P	I/O	-	-
37	LA33_N	I/O	-	-
38	GND	-	-	-
39	6 VADJ	-	FMC_VADJ	VADJ power supply
40	GND	-	-	-

	H	I/O	Signal Name	Description
1	7 VREF_A_M2C	-	Test Pad	-
2	5 PRSNT_M2C_L	N/C	-	-
3	GND	-	-	-
4	CLK0_M2C_P	O	CLKout1_p	CLKout1 output from LMH1983 (positive)
5	CLK0_M2C_N	O	CLKout1_n	CLKout1 output from LMH1983 (negative)
6	GND	-	-	-
7	LA02_P	O	F_NO_REF	NO_REF pin output from LMH1983
8	LA02_N	O	F_NO_ALIGN	NO_ALIGN pin output from LMH1983
9	GND	-	-	-
10	LA04_P	O	F_NO_LOCK	NO_LOCK pin output from LMH1983
11	LA04_N	N/C	-	-
12	GND	-	-	-
13	LA07_P	I	F_CL_1983	SCL pin input to LMH1983
14	LA07_N	I/O	F_DA_1983	SDA pin input/output to/from LMH1983
15	GND	-	-	-
16	LA11_P	I	F_S10	Clock Select Signal S10
17	LA11_N	I	F_S11	Clock Select Signal S11
18	GND	-	-	-
19	LA15_P	I	F_S20	Clock Select Signal S20
20	LA15_N	I	F_S21	Clock Select Signal S21
21	GND	-	-	-
22	LA19_P	I/O	-	-
23	LA19_N	I/O	-	-
24	GND	-	-	-
25	LA21_P	I/O	-	-
26	LA21_N	I/O	-	-
27	GND	-	-	-
28	LA24_P	I/O	-	-
29	LA24_N	I/O	-	-
30	GND	-	-	-
31	LA28_P	I/O	-	-
32	LA28_N	I/O	-	-
33	GND	-	-	-
34	LA30_P	I/O	-	-
35	LA30_N	I/O	-	-
36	GND	-	-	-
37	LA32_P	I/O	-	-
38	LA32_N	I/O	-	-
39	GND	-	-	-
40	6 VADJ	-	FMC_VADJ	VADJ power supply

4.9. LED Display

Table 4-5 shows the status information provided by onboard LEDs.

Table 4-5 LED Status Display

No	Circuit#	Description	Status
1	D2	LMH0387 carrier detection on CH0 RX	OFF: Detect, ON: Non-detect
2	D4	LMH0387 carrier detection on CH1 RX	OFF: Detect, ON: Non-detect
3	D8	LMH0387 carrier detection on CH2	OFF: Detect, ON: Non-detect
4	D9	LMH0387 carrier detection on CH3	OFF: Detect, ON: Non-detect
5	D5	LMH1983 NO_LOCK pin	OFF: Detect, ON: Non-detect
6	D6	LMH1983 NO_ALIGN pin	OFF: Detect, ON: Non-detect
7	D7	LMH1983 NO_REF pin	OFF: Detect, ON: Non-detect

Preliminary

Preliminary

**TOKYO ELECTRON DEVICE**

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